SUBMISSION FOR MARKET SOUNDING

ACT Waste Feasibility Study

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Executive Summary

The following submission document has been formulated as part of a Market Sounding exercise for Waste Feasibility Study of the ACT Government, Australia.

The submission identifies and proposes following points for improved waste management in ACT:

- The waste strategy needs to be focussed on avoiding waste
- Education, awareness and training about waste and waste management needs to be increased
- Waste segregation has to be enforced
- Food cosmetic standards have to be relaxed
- Composting of organic substances has to be increased
- Research and development needs to be given impetus in design and packaging
- Alternatives for plastics, polystyrene and Styrofoam need to be promoted
- Formal data collection on waste has to be carried out
- Waste data should be shared publicly

List of Recommendations

Recommendation 1: The ACT Government consider refocussing its attention on waste avoidance and reduction through policies, education, legislation and projects.

Recommendation 2: ACT Government consider formulating a single, strong and unified vision and mission to successfully improve waste education in ACT.

Recommendation 3: The ACT Government consider following the three-step structure of what and how for the waste education in ACT.

Recommendation 4: The ACT Government create a robust social marketing plan to increase education and awareness levels to cope with the ever-changing waste industry and then work to maintain these education and awareness levels.

Recommendation 5: The ACT Government increase waste sorting facilities in ACT.

Recommendation 6: The ACT Government increase screening of C&I waste stream for effective sorting.

Recommendation 7: The ACT Government consider relaxing cosmetic standards for foods at procurement level in supermarkets, restaurants and other food retail.

Recommendation 8: The ACT Government increase awareness among bulk buyers and sellers through above the line marketing channels like newspaper ads, television and radio commercials, to demote bulk buy and achieve a reduction in food waste.

Recommendation 9: The ACT Government consider introducing mandatory composting for food consumption businesses in the food industry. The ACT Government can offer financial incentives or subsidies to businesses for composting.

Recommendation 10: The ACT Government consider mandatory training and education for waste sorting and enforcing strict waste segregation practices for businesses in food consumption.

Recommendation 11: The ACT Government consider promoting innovation in producing environment friendly alternatives to polystyrene and Styrofoam, used in the food retail sector and promote them by proving financial incentives to users of these products.

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Recommendation 13: The ACT Government consider controlling, limiting and reducing single-use disposable containers' production and sale in the ACT by imposing heavy taxes, surcharges and enforcing laws on manufacturers and importers.

Recommendation 14: The ACT Government can simultaneously start educating community through above the line marketing channels like newspaper ads, television and radio commercials. The ACT Government can encourage the use of eco-friendly, compostable containers made from natural products, through public awareness of current products.

Recommendation 15: The ACT Government can support innovation and organisations through financial incentives to leverage technology and increase innovation to replace single-use disposable products.

Recommendation 16: The ACT Government consider Paprgyropoulou et. al.'s framework for food waste assessment and develop a food waste assessment plan for use in ACT.

Recommendation 17: The ACT Government can start with itself, in shifting from paper-based system to electronic system of working. The ACT Government can then approach other entities and encourage less dependency on paper, and efficient use of paper and paper related products.

Recommendation 18: The ACT Government can introduce responsibilities on organisations to educate and train their employees for waste reduction and management at their workplace.

Recommendation 19: The ACT Government can introduce responsibilities on waste management companies to educate and/or train the users of the infrastructure, where the waste management companies have been contracted to work.

Recommendation 20: The ACT Government can assist and encourage organisations that are active in waste management through ways like recognition, awards and incentives.

Recommendation 21: The ACT Government consider supporting manufacturers of products that cannot be composted, reused or recycled, through financial incentives.

Recommendation 22: If the waste products are not compostable, reusable or recyclable, the ACT Government consider holding manufacturers responsible for management of this waste and avoid diverting it to landfills.

Recommendation 23: The ACT Government can introduce programmes and/or campaigns to bring source reduction and promote the use of existing buildings in ACT.

Recommendation 24: The ACT Government consider introducing waste management requirements for C&D sector to achieve improved sustainability, waste data management, environmental quality, and best practices.

Recommendation 25: ACT Government can introduce 'producer responsibility' and 'polluter pays' principle.

Recommendation 26: ACT Government consider setting up facilities for re-selling useful materials generated from the C&D processes.

Recommendation 27: The ACT Government consider formal, micro-level accurate waste data collection.

Recommendation 28: The ACT Government consider making the formally collected waste data available openly.

Recommendation 29: The ACT Government consider leveraging from data analytics for improved waste management in ACT.

Recommendation 30: The ACT Government consider campaigns that focus more on awareness and education about waste and waste management.

Recommendation 31: The ACT Government can use focussed below-the-line (BTL) marketing for poorly performing areas, suburbs or localities in ACT.

Recommendation 32: The ACT Government can encourage masses to buy services or activities instead of manufactured goods as recreational items or gifts through marketing campaigns.

Recommendation 33: The ACT Government consider creating a sense of emergency, urgency or introducing competitions to ensure that waste education is applied.

1. Introduction

Canberra is forecasted to grow in terms of population (ABS, 2017). Canberra has also grown in terms of businesses by 10.1% from 2014-15 (CanberraConventionBureau, 2016). With this growth in population and businesses, several negative impacts, including increased wastes, will also come alongside. And as a precautionary action, necessary steps need to be taken in order to make ACT a sustainable and environment-friendly region.

The ACT Government announced a market sounding exercise in 2017 to support its Waste Management Strategy 2011-2025. The ACT Government will be seeking suggestions, opinions and advice from entities in the ACT region that are active and/or interested in the waste management sector.

The ACT Market Sounding for waste management is a positive step towards achieving Waste Management Strategy 2025 targets. These targets include the creation of carbon-neutral waste sector by 2020 and full resource recovery by 2025 (ACTGovernment, 2011).

The Conservation Council ACT, a non-government and not-for-profit organisation, has been a leader in environmental activities in the ACT region. Concerning about wastes in the ACT, the Conservation Council welcomes the ACT Government's market sounding initiative and seeks to support it through this submission.

The Conservation Council is keen to work on the market sounding and seeks to positively contribute to achieving goals of the ACT Waste Feasibility Study and Waste Management Strategy 2011-2025 through this submission.

1.1 Aim

The aim of the submission is to support ACT Government's Market Sounding exercise for waste management in ACT. As a result, the submission will generate the following outcomes:

- Improved knowledge and understanding about waste in ACT;
- Increased knowledge and understanding about waste management performance and best practices in ACT;
- Improved social marketing for waste and waste management in ACT.

The submission seeks to achieve target outcomes by emphasising the areas discussed below.

1.2 Submission Structure

The document has been structured in the following manner and aims to cover areas that were found to be poorly performing in the waste management process in ACT:

1. Strategy Focus
2. Waste Education and Awareness

3. Commercial and Industrial Stream
4. Construction and Demolition Stream
5. Data and Technology in Waste
6. Social Marketing

1.3 Research Methodology

For obtaining information, the Waste Data Room provided by the ACT Government was extensively used to compare and analyse various sets and types of data related to wastes in ACT. This data was compared with data from other credible sources and various findings were interpolated. At the end of discussions, suitable and appropriate recommendations were then identified and provided in the submission.

Apart from that, possible solutions for waste problems and issues in ACT, based on examining global best practices for respective areas in waste management, have also been provided.

Because of the high amounts of waste contributions from the C&I stream, the focus of the document has been centric to the C&I stream. However, the document also covers other streams and areas that are not performing effectively and thus, suggests appropriate measures to deal with the issues, respectively.

2. Strategic Focus

2.1 Avoid Waste

The Australian Capital Territory has one of the highest per capita contribution to waste in Australia. According to Waste Data Room, about 1.04 million tonnes of waste was generated in 2014-15 with about 70.3% recycling (Lille, 2017).

With a seven stage approach from 'avoid' to 'dispose', the 2025 strategy establishes a very optimistic approach. However, it was observed that more impetus has been given to 'recycle' and 'recover' stages. For example, the following excerpt from one of the ACT Government's presentation[1] document acknowledged:

"Producing energy from waste and incineration"

It was perceived that 'producing energy from waste' and similar measures were introduced too early within the scope of market sounding. Moreover, this gives an impression of hurrying to later and easier levels in waste management, without taking into account the top priorities in the hierarchy.

Since the population of the city is already set to rise and the city has also been one of the highest emitters of CO_2 in Australia, managing waste through energy from waste or

[1] Slide 3, ACT Waste Feasibility Study CRG Presentation, held on 13th February 2017.

incineration will make air conditions even worse and only result in increased greenhouse gas levels (PWC, 2008, pp. 6). Moreover, it will make it harder to achieve the ACT Government's targets of its strategy to make Canberra carbon neutral by 2025.

The Conservation Council believes that recycling and recovering are an important part of the waste hierarchy in waste management; however, they should be considered if and only if, waste avoid, reduce, or reuse fail as options in managing wastes. Avoidance should always be the first and the topmost priority in waste management; whereas, energy from waste should be considered as one of the last steps.

Therefore, the Conservation Council strongly believes that producing energy from waste should be thought and discussed only after deeply exploring, understanding and evaluating avoid, reduce and reuse levels. The Conservation Council urges ACT Government to refocus its attention to waste avoidance.

> ***Recommendation 1: The ACT Government consider refocussing its attention on waste avoidance and reduction through policies, education, legislation and projects.***

3. Waste Education and Awareness

3.1 Unified Vision

The ACT Government has an unclear strategic focus and vision to formulate an engaging and innovative waste education system in ACT. This can be drawn from the Draft Business Case, which clearly mentioned:

> *"There is no single ACT Government vision for waste education that directly supports an agreed set of desired outcomes." (Draft Business Case, p. 11)*

For waste education, there are multiple versions of visions for waste education. These multiple visions about waste education can lead to multiple interpretations by different stakeholders. It will also severely affect the strategy and result in undesirable outcomes.

According to Larson et. al. (2014), mission identifies the scope and provides a focus for decision making (pp. 26). Additionally, Larson et. al. argued that a clear mission, coupled with a clear vision is necessary to deal with current and changing environments (pp. 48).

The Conservation Council considers that ACT Government needs to have a clear vision, along with a mission for achieving success in increasing education about waste. The ACT Government can follow the structure given below for education in waste to overcome aforementioned issues with clear vision and mission (Larson et al., 2014, pp. 26).

1. Identify and define what ACT Government wants to become in the waste education sector. Identify what ACT Government wants to see in the waste education sector

2. Analyse and formulate strategies to identify how ACT Government will bring about changes, improvements.
3. Implement these strategies through projects, campaigns, programmes, etc.

Answering the what parts will help ACT Government in setting out the focus for waste education and create a shared image of what everyone needs to achieve and this will also act as the benchmark for measuring progress. It is crucial that this mission and vision is shared and agreed with the stakeholders and carefully aligned with the strategies of waste education.

Next, the how parts will help ACT Government formulate clear roadmap to implement its vision and mission. Setting scope and identification of accurate resources and time for realising the target outcomes in waste education will become easier for the ACT Government holistically.

The Conservation Council recommends ACT Government to consider using the aforementioned structure for other environmental and social welfare initiatives; as it will result in an effective administration and efficient management of such initiatives.

> ***Recommendation 2: ACT Government consider formulating a single, strong and unified vision and mission to successfully improve waste education in ACT.***
>
> ***Recommendation 3: The ACT Government consider following the three-step structure of what and how for the waste education in ACT.***
>
> ***Recommendation 4: The ACT Government can create a robust social marketing plan to increase education and awareness levels to cope with the ever-changing waste industry and then work to maintain these education and awareness levels.***

Section 7. Social Marketing in the later part of the document discusses in details about the social marketing aspects.

3.2 Education and Awareness Levels

Conservation Council believes that education about waste management is one of the most important factors that will help to improve waste management performance in ACT. Within the 2011-2025 Strategy, education has been given impetus; however, work at ground level seems to be poor. According to an audit in 2015, it was found that a third of recyclable waste materials were still being incorrectly disposed of, and on the other hand, a survey showed that one in 10 practiced bundling recyclables in plastic bags, which should be avoided (Burgess, 2015).

In another study carried out in 2016 at select medium sized organisation offices in Canberra, only 64.3% employees considered themselves as “green person” (Liu, 2016). When asked upon why segregation of waste was not being performed effectively, the top reasons were found as:

1. Laziness;
2. Carelessness;
3. Lack of time;
4. Demographic difference;
5. Not a priority.

From the above information, it can be drawn that education levels were satisfactory. However, regardless of these satisfactory education levels, the subjects (employees) of the study were not performing segregation or management of waste due to personality and behaviour related factors.

Therefore, it can be argued that the poor waste management was caused possibly because of factors like:

- Lack of awareness about the various negative impacts of waste in short and long terms;
- Lack of encouragement from the organisations;
- Lack of supervision about waste management.

The Conservation Council believes that education does play an important role in waste management and it should be a priority within the strategy; however, successful application and practice of this waste education is also crucial. Failure in the proper application of education will be a total waste of time, resources and efforts and eventually will lead to not realising the strategic outcomes.

Therefore, the Conservation Council urges that appropriate application of the waste education in ACT is ensured. A possible way to increase the implementation of education can be through creating a sense of emergency, urgency or competition. This has been discussed in detail in later Section 7 of Social Marketing.

From here onwards, the document discusses the stream-wise problems and issues in waste in ACT.

4. Commercial and Industrial

The consumer age has brought an increase in commercial and industrial (C&I) waste tremendously. This rise is evident in the C&I waste category, which contributed the highest amount of waste of 117,778 tonnes generated in ACT during 2014-15 (Lille, 2017). The contents under the C&I stream consisted waste from categories like recyclables, food and kitchen, organics, wood and textile products, and other plastic/metal/glass (Johnston and Cumming, 2015). Out of the total generated waste in C&I, almost 42.5% was sent to Mugga, NSW, and transfer station landfill sites (Lille, 2017).

From the above-mentioned evidence, it can be observed that most of the contents in the C&I waste stream that went unrecycled to the landfill sites, belonged to a category that could be reused, recycled, or converted into something with value; that too with currently available technology and facilities. However, the reasons for why waste materials that should not have been sent to landfill, got sent to landfill could be many; however, the two most common possibilities could be either, or both of the following that:

1) Zero or near to negligible reuse, recycle, recover value of materials;
2) Poor segregation at facilities;
3) Poor segregation at the waste generator or source level.

The Conservation Council believes that ACT Government can improve waste segregation by increasing the number of facilities in ACT. At the facility level, the ACT Government will have a wider influence and control in avoiding unnecessary diversion of wastes to the landfills. Through regulations and control in segregation of the wastes, enforcing stricter rules and increasing vigilance/inspections at the facility level the government can achieve better results. Moreover, leveraging technology for segregation can also prove beneficial (see Section 6.2.1 Upgrading Segregation Technology).

> ***Recommendation 5: The ACT Government can increase waste segregation facilities in ACT.***
>
> ***Recommendation 6: The ACT Government can increase screening of C&I waste stream for effective segregation.***

4.1 Composition of C&I Stream

According to a study into C&I waste and recycling, the composition of waste in the C&I stream contained a majority of wastes from segments of (Bremner and Allan, 2013):

- Masonry materials;
- Metals (steel and aluminium);
- Organics (food and garden);
- Paper and cardboard (cardboards, office and other paper);

- Plastics (packaging);
- Glass (packaging glass);
- Textiles (leather and textiles);
- Clinical (health sector clinical waste);
- Others.

The study suggested that apart from cardboard, paper and paper products and aluminium and steel in metals, other segments were directed to landfills[2]. The following topics discuss these wastes in the C&I stream that were directed to landfills.

4.1.1 Organics

The organics (putrescibles) include following areas that were found to be having a potential for improvements.

- Food waste from cosmetic standards;
- Food retail bulk buy;
- Food consumption waste;
- Food retail packaging waste;
- Single-use disposable material.

Food cosmetics. Retail food is all food, other than the food available in restaurants (Rick Suttle, 2017, para. 1). It is purchased by the customers and consumed off-premise. Under this category, supermarkets are the dominant entities and they act as an intermediary between farmers and consumers (Parfitt et al., 2010, para. 16).

In Australia, one-third of all food grown goes to waste (Gough, 2016, para. 4); and although these supermarkets publicise their policies to donate unsold or surplus food that is fit for human or animal consumption; the real waste generation by these supermarkets takes place during the procurement of these foods from suppliers.

Supermarkets set cosmetic standards for procurement of the food and these standards put a lot of pressure on suppliers to meet the right size, colour, shape, and other appearance-related fit-for-purpose quality features defined by the supermarkets. As a result, all the food that meets the standards is accepted. However, food that misses out on either one or all of the cosmetic standards, but still fit for consumption, ends up being rejected and gets thrown away. This results in high food wastage and moreover, supermarkets do not take ownership of rejected food that does not meet their own interpretation of cosmetic standard (Richards and Devin, 2016, para. 12).

[2] The Waste Data Room did not include the exact contents of the waste that was diverted to landfills. Therefore, as a reference point, readings from other sources have been used.

The Conservation Council believes that the monopoly of supermarkets needs to be cut down in the procurement of food. This results in wastage of resources and energy at a very high level. The Conservation Council urges ACT Government to highly consider relaxing cosmetic standards for foods at the procurement level in supermarkets and other food retail through rules or legislation.

Recommendation 7: The ACT Government consider relaxing cosmetic standards for foods at procurement level in supermarkets and other food retail.

Food retail bulk buys. Supermarkets and general stores often encourage customers to purchase food excessively (Baumeister, 2002, pp. 671, Ene, 2008, pp. 77). Because of availability of cheap storage of such commodities, offering discounts is also easier for businesses. Thus, they provide discounts on bulk purchasing of products, which consumers purchase mainly because (Hoch and Loewenstein, 1991):

- To buy products at discounted rates;
- Actual necessity;
- Because off desire.

Baumeister (2002, pp. 675) and Hoch et. al. (1991, pp. 492) argued that due to the failure of self-control and irresistible impulses, along with lucrative price and savings advertised, the customers often buy things that are unnecessary, and in excess. Moreover, a study undertaken in 2015 revealed that 40% of the food purchased for stock, especially by businesses, goes to the bins in Australia (Boothroyd, 2016, para. 1).

In order to reduce food wastage occurring because of purchasing in bulk, it has to be recognised that it is moral responsibility of both, the sellers as well as consumers, to prevent the wastage of the food. Sellers need to ensure that they promote responsible purchasing of food through their businesses. On the other hand, consumers should not surrender to lucrative prices and offers and buy in excess.

Therefore, in order to increase awareness, the ACT Government consider promoting following questions among buyers and sellers in ACT through social marketing campaigns. Both sellers and consumers should ask (Ene, 2008, pp. 79)

- “Can it be reused?”
- “Does it have a long product life?”
- “Does it have minimum packaging?”
- “Does it have minimum toxicity?”
- Customers should ask, “is it really a necessary purchase?”

Recommendation 8: The ACT Government can increase awareness and education among bulk buyers and sellers through above the line marketing

channels like newspaper ads, television and radio commercials, to demote bulk buy and achieve a reduction in food waste.

Food consumption waste. This part of the document refers to food sold and consumed at restaurants, cafes, institutions, hospitals, etc. and the food waste occurring from these sources. Food waste in this area occurs due to many reasons like inappropriate storage, processing, evaluation (quality of end product), end of life, etc. A study undertaken in 2015 revealed that 40% of the food purchased for stock, goes to the bins in Australia (Boothroyd, 2016, para. 1).

Possible solutions to address above issues and reduce waste direction to landfills can be:

- Mandatory composting of organic food waste for food consumption businesses;
- Offering financial incentives or subsidies for use of composting;
- Education and awareness.

Several strategic approaches to deal with the waste in the area of food consumption from commercial and household kitchens have been suggested and being implemented. However, a clear and unified approach for waste management in these kitchens seems to be missing. Therefore, a framework for food waste assessment has been discussed in this Section 4.1.2 below (see Figure 1).

Recommendation 9: The ACT Government consider introducing mandatory composting for food consumption businesses in the food industry. The ACT Government can offer financial incentives or subsidies to businesses for composting.

Recommendation 10: The ACT Government consider mandatory training and education for waste sorting and enforcing strict waste segregation practices for businesses in food consumption.

Food retail packaging waste. Plastics and polystyrene have wide applications in food retail. The packaging of food products is undertaken mainly by the producers/sellers. The Waste Data Room showed that all the expanded polystyrene waste (5 tonnes) generated in ACT was sent to landfills[3].

Approximately 40% of Polystyrene and Styrofoam applications are for short-term and single-use (MWRRG, 2016, para. 2). In ACT, approximately five tonnes of expanded polystyrene was generated and sent to landfill in 2014-15 (Lille, 2017). These petrochemical based foams contain CFCs (chlorofluorocarbons) and do not breakdown, thus turning into environment

[3] Polystyrene waste generated figures are estimates with errors.

pollutants (PolystyreneSheets, n.d., pp. 4). Although white polystyrene of medium and large sizes can be recycled, when thrown in garbage bags (example, meat and food trays), end up in landfills (MWRRG, 2016, para. 8).

To reduce the packaging waste caused by end-users, one of the most effective ways is to regulate and improve it at producer/seller level and this can be achieved through innovation in the designing of the packaging. For example:

- Containers and trays manufactured from plant fibres (example: corn starch, palm fibre, wheat stocks, etc.). Such environment-friendly containers and trays take 30-90 days to compost at homes and municipal composting facilities and can be used in meat, vegetables and other product packaging, where polystyrene and Styrofoam are used (BeGreenPackaging, 2011).

  Recommendation 11: The ACT Government consider promoting innovation in producing environment-friendly alternatives to polystyrene and Styrofoam, used in the food retail sector and promote them by proving financial incentives to users of these products.

  Recommendation 12: The ACT Government consider mandatory training and education for polystyrene and Styrofoam waste sorting and enforcing strict waste sorting practices for businesses.

Single-use disposable materials. Single-use disposable containers and tableware like coffee cups, takeaway containers and disposable cutlery constitute large amounts of wastes. Many of these disposable coffee cups and containers that look like made from the paper have a thin layer of plastic, which does not break down. The exact of the quantity of these containers is unknown due to the absence of data; nevertheless, in Australia alone, the number of disposable coffee cups used is estimated to be around 1 billion each year (White, 2016, pp. 6). Most of these disposable containers are recyclable but nearly 90% of them end up in landfills with approximately 60,000kg of plastic stuck to them (White, 2016, pp. 7). Whilst the paper contents break down, the thin layering of plastic later possesses a threat to the environment.

It has been seen that low cost of plastic containers is the major driving force behind the use of these plastic containers. As of now, many dos and don’ts, and rules and regulations have been implemented on either the manufacturers or users of such containers. However, the sellers of these containers hold no responsibility and businesses tend to adopt the easiest and cheapest available container option to sell their product (ABCNews, 2016).

In order to deal with this, some of the possible solutions the ACT Government can consider to promote are:

- In Germany, the use of disposable tableware and food containers has been banned in various areas (Seguchi and Hotta, 2013, pp. 15). Instead, they are served in clay or glass tableware under a deposit system and not as disposable tableware. Many cities and villages have implemented this strategy mainly at public events and festivals, and the results have been significant; for example, the overall amount of waste generated decreased by 50% in Munich from 1990 to 2004 at public events (ACR+ and IBGE, 2011, pp. 6).
- Using own coffee cup/containers.
- Choosing reusable or environment-friendly containers.
- Avoiding use of plastic lids/separating plastic lids at disposal.
- Edible cutlery is gaining attention. The ACT Government can promote innovation in this sector.

Recommendation 13: The ACT Government consider controlling, limiting and reducing single-use disposable containers' production and sale in the ACT by imposing heavy taxes, surcharges and enforcing laws on manufacturers and importers.

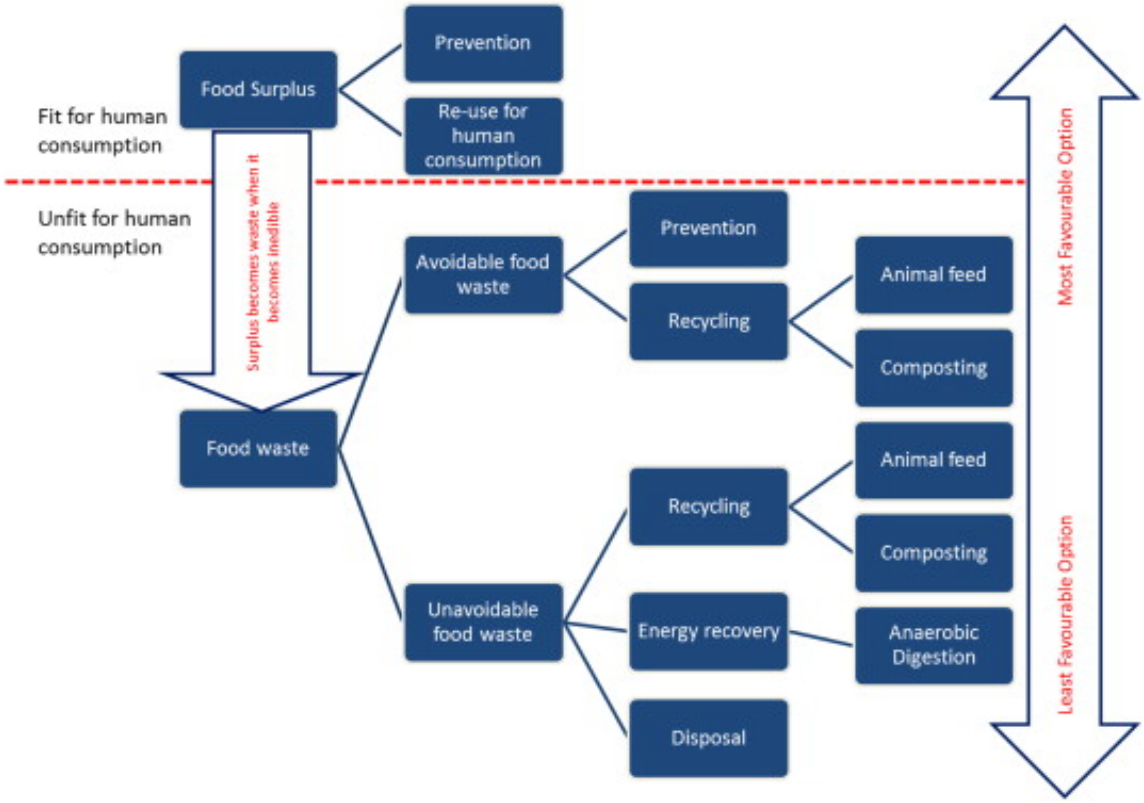
Recommendation 14: The ACT Government can simultaneously start educating community through above the line marketing channels like newspaper ads, television and radio commercials. The ACT Government can encourage the use of eco-friendly, compostable containers made from natural products, through public awareness of current products.

Recommendation 15: The ACT Government can support innovation and organisations through financial incentives to leverage technology and increase innovation to replace single-use disposable products.

4.1.2 Framework for Food Waste Assessment

A framework for assessing waste in aforementioned food related areas has been identified by Papargyropoulou et. al. (Papargyropoulou et al., 2014, p. 113). Following Figure 1 shows the framework. Key advantages of the framework are that foods at various stages are directed for either recycling, reuse or recovery. It also ensures disposal is implemented in the last stage of the assessment of foods. This resonates with the waste hierarchy plan of the ACT Government. Therefore, the ACT Government can implement Papargyropoulou et. al. framework in waste assessment for the food industry in ACT.

Figure 1: Framework for Waste Assessment (Papargyropoulou et al., 2014)



Recommendation 16: The ACT Government consider Papargyropoulou et. al.'s framework for food waste assessment and develop a food waste assessment plan for use in ACT.

4.1.3 Paper and Paper Related

In terms of businesses, Canberra has grown in 2015-16 by 10.1% than last year (CanberraConventionBureau, 2016). Canberra's population also grew with a growth rate of 1.3% in September 2016 (ABS, 2017). In addition to that, the 2020 Tourism Strategy of ACT also aims at increasing tourism in the territory by the year 2020 (ACTGovTourism, 2013).

The current recycling rates of paper and cardboard-based materials in ACT are shown to be high in the Waste Data Room (Lille, 2017). However, with the expected growth in population, business and tourism in ACT, it is obvious that paperwork will also increase tremendously. Keeping in mind the hierarchy of waste management, the focus in this area has to be shifted on reducing overall dependency on paper, paper related, and similar materials in day-to-day life.

In a study carried out in 2016, amongst employees at selected organisations in Canberra, only 64.3% employees considered themselves as "green person" (Liu, pp. 14). When asked upon

why sorting of waste and recyclables was not being performed effectively, the top three reasons were found as:

6. Laziness;
7. Carelessness;
8. Lack of time.

With satisfactory levels of waste education, personality and behaviour related factors resulted in improper waste management. Moreover, food waste bins in some places were also found to be missing, whilst only one general waste bin kept at employee desks.

Other factors like poorly marked bins, inadequate or no information about the bins, and their inconvenient proximities were also identified to be the causes of poor waste management. Therefore, as a response, the study provided several strategies to boost waste reduction and management in this particular area like (Liu, 2016, pp. 26).

- Shifting from paper-based systems to electronic systems;
- Reducing printing;
- Using double-sided printing;
- Using environment-friendly paper;
- Using reusable tableware/cutlery in workplaces.

4.1.4 Action Plan

ACT Government. The ACT Government can assist and encourage organisations active in waste management in the ACT region through recognition and incentives. The ACT Government can start with itself, and then proactively approach and start encouraging above mentioned best practices through education to communities, industries and businesses. It can offer special benefits/awards to entities that also actively support in this process through programmes.

Organisations. ACT Government encourage organisations to take a leading stance to encourage waste management best practices like increasing electronic documentation, reducing printing, efficient two-sided printing when necessary, using environment-friendly paper. The practice of efficient waste sorting within organisations through multiple bins and stating clear information on them. Training employees for waste reduction and management, and educating about impacts of negligent or ignorant behaviour

Waste Management Companies. ACT Government can make it mandatory for waste management companies to educate building infrastructure users through notices and stickers, about waste generated, its impacts, and how it can be reduced. Provide infrastructure users with clean and usable waste facilities. Provide clear and succinct information on bins for efficient waste sorting. Train relevant infrastructure users.

Manufacturer responsibility. The C&I stream, as a whole, consists wide range of wastes that sometimes cannot be composted, recycled or even reused. For such waste products, the ACT Government consider finding ways through a public-private partnership to dissect such products until they are suitable for recycling or reusing.

Another solution could be holding the manufacturer responsible for the product and avoid directing these waste products to landfills. As a result, the manufacturer would eventually seek for alternatives that can be either reused or recycled, saving up diversions to landfills.

Recommendation 17: The ACT Government can start with itself, in shifting from paper-based system to electronic system of working. The ACT Government can then approach other entities and encourage less dependency on paper, and efficient use of paper and paper related products.

Recommendation 18: The ACT Government can introduce responsibilities on organisations to educate and train their employees for waste reduction and management at their workplace.

Recommendation 19: The ACT Government can introduce responsibilities on waste management companies to educate and/or train the users of the infrastructure, where the waste management companies have been contracted to work.

Recommendation 20: The ACT Government can assist and encourage organisations that are active in waste management through ways like recognition, awards and incentives.

Recommendation 21: The ACT Government consider supporting manufacturers of products that cannot be composted, reused or recycled, through financial incentives.

Recommendation 22: If the waste products are not compostable, reusable or recyclable, the ACT Government consider holding manufacturers responsible for management of this waste and avoid diverting it to landfills.

5. Construction and Demolition

Construction and demolition (C&D) waste quantities formed approximately 6.5% of the total waste generated (Lille, 2017). Within C&D, recycling and recovery rates are considerably high;

however, a robust waste minimisation and management plan still need to be formulated and imposed on the entities active in C&D.

5.1 Source Reduction

Waste in C&D can be best brought through reduction at source. The ACT Government can consider the implementation of preserving existing buildings wherever possible as construction and demolition will create more waste.

5.2 Waste Minimisation Plan

As of now, ACT Government has not made it mandatory for companies in C&D to produce and implement a waste management plan for their projects. In order to promote waste minimisation in C&D, the ACT Government can introduce rules or laws, that would require the construction and demolition companies to prepare a waste management plan for their respective projects. It should be noted that the plans cover the following points (Fatta et al., 2003, pp. 87):

- Sustainability;
- Estimation, capturing, storing and sharing of complete lifecycle of waste (example: estimation and generation quantities, sorting, transferring and disposal information);
- Energy and natural resources conservation, and environmental investments;
- Minimisation of hazardous waste generation (example lead, asbestos);
- Maximum implementation of reduce, reuse, recycle and recover;
- Biodiversity offsetting;
- Safe concluding disposal.

In order to robustly implement above points, the ACT Government can introduce producers' responsibility. Holding the producers responsible will help in establishing accountability in waste generation. Entities like builders and contractors will proactively work at their levels to practice above points. Moreover, in order to reinforce this producers' responsibility, the ACT Government can also consider 'polluter pays' principle. The party involved in the waste generation but neglecting above points, and showing reluctance in abiding by the rule/law, could be charged/fined for the environmental and other damages caused. The ACT Government can consider making these charges/fines severe.

5.3 Re-buy and Re-sell

The ACT Government can encourage re-buying and re-selling of useful materials generated as waste or by-products of construction and demolition works. The Government can establish facilities, or contract interested parties to deal with the buying and selling processes of materials. The ACT Government can also consider leveraging this to earn commission from the sale of such materials. Alternatively, the ACT Government can also use this waste for its

own purposes; for example, using rubble for filling/levelling purposes in the road or other construction works and not just for covering landfills.

Recommendation 23: The ACT Government can introduce programmes and/or campaigns to bring source reduction and promote the use of existing buildings in ACT.

Recommendation 24: The ACT Government consider introducing waste management requirements for C&D sector to achieve improved sustainability, waste data management, environmental quality, and best practices.

Recommendation 25: ACT Government can introduce 'producer responsibility' and 'polluter pays' principle.

Recommendation 26: ACT Government consider setting up facilities for re-selling useful materials generated from the C&D processes.

6. Data and Technology

There are several sections in the Waste Data Room that clearly do not have reliable and accurate data. In some places, there is no waste-related data at all. For example, data collection for hazardous wastes is not performed in ACT; and according to KMH Environmental (2013), ACT and Tasmania do not have a formal intrastate hazardous waste tracking system.

Within the available data, where guestimates are mentioned, variations and gaps are large when compared to data from other reliable sources. At some places where data is available, quality and reliability issues linger within.

The open data on waste and its management is of very poor quality and quantity (Australia wide); and therefore, it can be regarded as there is a 'data poverty' when it comes to data collection of the overall lifecycle of waste. This makes it difficult to understand, monitor and improve the performance levels of waste management. Some of the reasons for this data poverty could be either, or both of the following that:

1. Data is being collected but not being shared;
2. Data is not being collected at all.

6.1 Importance of Data

Formal data collection is very crucial as it enables correct decision making and reduction of errors (Sapsford and Jupp, 2006). In the management of waste, availability of data can provide a baseline, which can be used to measure against targets and improve. It allows

accurate identification of problems, analyses and possible solutions to address them. End results, outputs, outcomes can be verified and then validated; and these can be used for future references as well.

Accurate data on wastes can help ACT Government to target poorly performing areas and deploy resources efficiently. The ACT Government can also track and improve areas that performing well. Apart from that, making waste data available openly will help in educating masses and increase their participation in proper waste management. Open waste data can support other non-government organisations and individuals for educational and development purposes. Possibility to identify key areas for improvement will also increase and overall, this will, in turn, support ACT Government achieve its strategies and realise outcomes effectively.

Therefore, in order to measure waste management performance in ACT, it is imperative to find innovative ways to collect micro level data. The Conservation Council urges the ACT Government to consider formal and accurate waste data collection, storage and sharing and making it available openly.

> ***Recommendation 27: The ACT Government consider formal, micro-level accurate waste data collection.***
>
> ***Recommendation 28: The ACT Government consider making the formally collected waste data available openly.***

6.2 Data Analytics and Technology

Data analytics is comparatively new but widely used in different areas for making informed decisions. Using the data collected from formal collection methods, the ACT Government can leverage data analytics to improve waste management in ACT.

For example, solar powered smart bins which not only compacts trash but also provides valuable insights about how much trash is collected (BigBelly, n.d.). This helps garbage collection agencies to take a decision like a route optimisation, logistics, understanding public behaviour, etc.

Next step is analysing data and monitoring changes. The collected data could be used for descriptive analysis for finding trends and usage information or predictive analysis to mitigate problems before they occur. It is important to have a quantifiable value to measure overall impact. Granular data about customer behaviour helps in advanced analysis and informed decision making.

The final stage of analysis would involve evaluation of the analysis. Statistical and advanced predictive modelling techniques could help in providing a solution, but it is equally important to know how well did the solution meet the business expectation. Statistical and mathematical modelling provide tools to measure the impact of the analysis. This would help iteratively to improve the analysis until the desired results are met. ACT Government could, therefore, leverage from such analysis for improved and informed decision making in waste management.

Recommendation 29: The ACT Government consider leveraging data analytics for improved waste management in ACT.

6.2.1 Upgrading Segregation Technology

The ACT Government can improve segregation of waste at sorting facilities through procuring modern technologies like optical sorting and trash processing systems. For example, camera, laser, sensor and imaging sensor systems, which require less human interference and are efficient at segregation of waste at a much faster rate.

6.3 Households

For the collection of household wastes like garbage and recyclables, a unique mechanism of pay-as-you-throw (PAYT) is being implemented in countries like the United States and New Zealand (Preiss, 2016, para. 3). This mechanism facilitates flexibility when it comes to paying fees related to wastes. Instead of charging the generators of waste, on a fixed periodic basis, PAYT system charges only when the generators want to throw away. Moreover, waste generators are charged on the basis of the weight being thrown away. Currently, in ACT, no such scheme is present and waste generators are charged fixed periodic basis. Advantages of PAYT are many for example:

1. Fair charges for less waste generators;
2. Monetary savings for waste generators;
3. Reduction in waste to landfills;
4. Reduction in load on waste collection and processing facilities.

7. Social Marketing

7.1 Campaigns

The ACT Government has mentioned using campaigns to increase education and awareness levels about waste, its impacts and proper handling (ACTGovernment, 2011). Campaigns to do this have already been deployed in the ACT region; however, their impacts were considered to have received not enough attention. One such example is the 2015 campaign of “recycling expert”, that was targeted at those aged 18 to 35 years (the age group with lowest recycling rates). After the campaign, it was found that a third of recyclable materials were still being incorrectly disposed of. On the other hand, a survey showed that one in 10 residents

practiced bundling recyclables in plastic bags. Nevertheless, the campaign cost $300,000, it was highly considered as a bizarre and odd way to spend money, and the campaign, thus, received a underwhelming response (Burgess, 2015).

Another issue with the campaign was that the contents of the campaign seemed to direct the target audience to the recycling website after providing very short information about waste.

Redirecting the target audience to the website and expecting them to educate themselves is difficult. As discussed earlier in Section 4.1.3, laziness, carelessness, negligence, and ignorance can be dominant problems of personality attitudes in waste management. Therefore, it is crucial that the campaign content itself does the job of educating as much as possible, rather than waiting for the target audience to educate themselves (for example, visiting websites).

The Conservation Council believes campaigns need to communicate the message with an approach that establishes a deeper emotional connection with the audience will be helpful.

Campaigns not only need to focus through ATL mediums but also through BTL mediums[4]. ACT Government can actively use BTL marketing as this will help in identifying problems with waste management practices, education and awareness at smaller and focussed groups of the target audience. Communicating through BTL marketing to smaller-focussed groups will help in making deeper and positive impacts. The audience tends to react and respond more, pays more attention and participates actively, thus reducing chances of personality attitude-related problems. Once educating through BTL marketing, the ACT Government can then encourage these groups to educate others groups or individuals within their circle to achieve the waste strategic goals.

Hence, the ACT Government can consider campaigns that stress more on:

- Delivering education and increasing awareness through its ATL and BTL marketing contents;
- Benefits and impacts on from big organisations to community, family, and individual levels;
- Current developments, actions, comparisons and achievements;
- Request more public participation;
- Communicate hurdles or difficulties.

[4] ATL marketing is marketing through mediums like newspapers, television, radio, etc. BTL marketing is marketing through focussed mediums like small group forums, community meetings, leaflets or banners in a targeted locality.

Apart from the topic discussed above, there are no campaigns that encourage buying services or activities instead of manufactured goods as recreational items or gifts. Encouraging the public to buy service or activities instead of manufactured goods can help in reducing waste generation and moreover, carbon generation. The Conservation Council believes that the ACT Government actively encourage public to buy services or activities instead of manufactured goods through its marketing campaigns.

Recommendation 30: The ACT Government consider campaigns that focus more on awareness and education about waste and waste management.

Recommendation 31: The ACT Government can use focussed below-the-line (BTL) marketing for poorly performing areas, suburbs or localities in ACT.

Recommendation 32: The ACT Government can encourage masses to buy services or activities instead of manufactured goods as recreational items or gifts through marketing campaigns.

7.2 Preventing Waste of Education through Social Marketing

Educating about waste is crucial; however, the application and implementation of this education cannot be ignored either.

A possible way to increase the implementation of education can be through creating a sense of emergency, urgency or through creating competition. The ACT Government can consider creating a sense of emergency in terms of waste. The Government, through its strategic marketing campaigns, can stress on negative impacts of showing negligence or carelessness towards waste. The ACT Government can consider introducing competitions or recognitions for organisations to innovate, identify and apply waste management best practices. The ACT Government can also encourage organisations to introduce such competitions and recognitions among their employees to support waste management in ACT.

Recommendation 33: The ACT Government consider creating a sense of emergency, urgency or introducing competitions to ensure that waste education is applied.

Bibliography

ABCNEWS 2016. Takeaway coffee cups driving hidden plastic catastrophe.

ABS. 2017. *Australian Demographic Statistics, Sep 2016* [Online]. Available: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0 [Accessed 6 April 2017].

ACR+ & IBGE 2011. Ban on disposal drink containers and tableware in Munich, Germany (Münchner Einwegverbot)

ACTGOVERNMENT 2011. ACT Waste Management Strategy.

ACTGOVTOURISM. 2013. *2020 Tourism Strategy* [Online]. Available: http://tourism.act.gov.au/industry-link/2013/12/2020-tourism-strategy/ [Accessed 12 April 2017].

BAUMEISTER, R. F. 2002. Yielding to temptation: Self-control failure, impulsive purchasing, and consumer behaviour. *Journal of consumer Research,* 28**,** 670-676.

BEGREENPACKAGING. 2011. *Excellent Packaging & Supply Debuts Foodservice Containers Made From Bulrush* [Online]. Available: https://begreenpackaging.wordpress.com/tag/meat-tray/ [Accessed 9 April 2017].

BIGBELLY. n.d. *BigBelly Solar Compactors* [Online]. Available: https://www.solarbins.com.au/features/big-belly-solar-bin/ [Accessed].

BOOTHROYD, A. 2016. *40 percent of Australian restaurant food wasted: study* [Online]. Available: http://www.hospitalitymagazine.com.au/food/news/40-percent-of-australian-restaurant-food-wasted-st [Accessed 9 April 2017].

BREMNER, A.-M. & ALLAN, P. 2013. A study into commercial & industrial (C&I) waste and recycling in Australia by industry division.

BURGESS, K. 2015. Canberra's Ricky Starr recycling campaign divides viewers. *The Canberra Times*.

CANBERRACONVENTIONBUREAU. 2016. *CANBERRA'S BUSINESS EVENTS RESULTS CONTINUES GROWTH TREND* [Online]. Available: http://www.canberraconvention.com.au/about/media/news/article/?id=canberras-business-events-results-continues-growth-trend [Accessed 12 April 2017].

ENE, C. 2008. Consumer Behaviour Concerning Post-Consumer Waste. *Petroleum-Gas University of Ploiesti*.

FATTA, D., PAPADOPOULOS, A., AVRAMIKOS, E., SGOUROU, E., MOUSTAKAS, K., KOURMOUSSIS, F., MENTZIS, A. & LOIZIDOU, M. 2003. Generation and management of construction and demolition waste in Greece—an existing challenge. *Resources, Conservation and Recycling,* 40**,** 81-91.

GOUGH, D. 2016. Seven solutions to supermarket food waste. *The Age*.

HOCH, S. J. & LOEWENSTEIN, G. F. 1991. Time-inconsistent preferences and consumer self-control. *Journal of consumer research,* 17**,** 492-507.

JOHNSTON, B. & CUMMING, M. 2015. Report ACT NOWaste 2015 Landfill and Transfer Station Waste Audits

KMH-ENVIRONMENTAL 2013. Hazardous Waste Data Summary.

LARSON, E., HONIG, B., GRAY, C. & BACCARINI, D. 2014. *Project Management : The Managerial Process*.

LILLE, M. V. 2017. Waste Dataroom

LIU, Z. 2016. Rethinking office based commercial waste recycling.

MWRRG. 2016. *Polystyrene Recycling* [Online]. Available: https://www.mwrrg.vic.gov.au/waste/recycling/polystyrene/ [Accessed 19 Mar 2017].

PAPARGYROPOULOU, E., LOZANO, R., STEINBERGER, J. K., WRIGHT, N. & BIN UJANG, Z. 2014. The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production,* 76**,** 106-115.

PARFITT, J., BARTHEL, M. & MACNAUGHTON, S. 2010. Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences,* 365**,** 3065-3081.

POLYSTYRENESHEETS. n.d. *Advantages And Disadvantages Of Polystyrene* [Online]. Available: http://polystyrenesheets.org/advantages-and-disadvantages-of-polystyrene [Accessed 19 Mar 2017].

PREISS, B. 2016. 'Pay as you throw' rubbish scheme proposed to cut household waste. *The Age*.

PWC 2008. ACT Light Rail Proposal to Infrastructure Australia.

RICHARDS, C. & DEVIN, B. 2016. *Powerful supermarkets push the cost of food waste onto suppliers, charities* [Online]. Available: https://theconversation.com/powerful-supermarkets-push-the-cost-of-food-waste-onto-suppliers-charities-54654 [Accessed 24 March 2017].

RICKSUTTLE. 2017. *What Is the Meaning of Retail Food?* [Online]. Available: http://smallbusiness.chron.com/meaning-retail-food-17255.html [Accessed 6 April 2017].

SAPSFORD, R. & JUPP, V. 2006. *Data collection and analysis*, Sage.

SEGUCHI, R. & HOTTA, Y. 2013. Best Practices and Recommendations for Waste Reduction.

WHITE, S. 2016. Takeaway coffee cups piling up in landfill as Australia's caffeine habit soars. *ABC News*.